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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Toru Koizumi

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EXAMINER

AGGARWAL, YOGESH K

ART UNIT

PAPER NUMBER

2622

MAIL DATE

DELIVERY MODE

06/07/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

09/678,296

Applicant(s)

KOIZUMI, TORU

Examiner

Yogesh K. Aggarwal

Art Unit

2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 31-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 31-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Arguments***

1. Applicant's arguments filed 03/16/2007 have been fully considered but they are not persuasive.

**Examiner's response:**

2. Applicant argues with regards to claim 1 that Nakamura fails to teach 1) a first selecting step of reading out a first signal accumulated in one unit of an accumulation period to a signal line by the selecting means; (2) a second selecting step of reading out a second signal accumulated in one unit of the accumulation period to the signal line by the selecting means, wherein the second signal is a signal remaining in the first transferring step; and (3) an adding step of adding the first signal and the second signal read out to the signal line.

The first step recites "a first transferring step of transferring the electric charges of the photoelectric conversion unit to the charge-voltage conversion unit". Therefore all charges are transferred from the photoelectric conversion unit to the floating diffusion unit. The claim further recites "a second transferring step of transferring the electric charges of the photoelectric conversion unit to the charge-voltage conversion unit....wherein the second signal is a signal remaining in the first transferring step". Therefore if all charges are transferred in the first step there is nothing left in the second step to transfer. The claim does not define as to how many charges are being transferred in the first step. For the purposes of claim interpretation, the claim will be interpreted to mean that all the charges are transferred in the first step and there is no remaining charges to be transferred in the second step. The claim is therefore broad enough to be interpreted as to transfer all the charges in the first step and no remaining charges to be

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transferred in the second step. One unit of accumulation period is defined as charges accumulated in figures 4a and 4d of Nakamura.

Even in Applicant's specification, at Page 15, lines 12-16 state that "After the transfer, as shown in Fig. 1C, the rest of the photo-electric charges remains with a photodiode exposed to intense light near a saturated state. With a photodiode exposed to very weak light, all charges may be transferred in some cases." Therefore there is a case that all the charges are transferred in some cases. The rest of the process at figures 1d and 1e will still be carried out even if there are no charges are left since there is no disclosure in the specification of a light detector or some other kind of device which lets the CPU know of the remaining amount of charges.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 31-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US Patent # 6,930,722) in view of Merrill (US Patent # 5,892,541).

[Claim 31]

Nakamura teaches a method of driving a solid image pickup device (figure 2) comprising a photoelectric conversion unit (21), a charge-voltage conversion unit (26) for converting electric charges from the photoelectric conversion unit into voltage signals, a signal amplification means (23) for amplifying the voltage signals generated in the charge-voltage conversion unit, and a

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charge transfer means (22) for transferring photoelectric charges from the photoelectric conversion unit to the charge-voltage conversion unit (col. 5 lines 45-52).

a first transferring step of transferring the electric charges of the photoelectric conversion unit to the charge-voltage conversion unit (e.g. charge Q1 generated in the one accumulation period in the photodiode 31 is transferred to detection node 33 as shown in figures 4a and 4b);

a first selecting step of reading out a first signal accumulated in one unit of an accumulation period to a signal line by the selecting means (figure 4c shows a resetting step wherein a part of the charge Q1 is skimmed off and Q2 is left. It is noted that skimming the charges involves pulse  $\phi$  read followed by a pulse  $\phi$  addr in order to transfer the signal charge to the vertical line 28, See col. 5 line 64-col. 6 line 2);

a reset step of resetting the charge-voltage conversion unit after the first signal is read out (figure 4c);

a second transferring step of transferring the electric charges of the photoelectric conversion unit to the charge-voltage conversion unit, a second selecting step of reading out a second signal accumulated in one unit of the accumulation period to the signal line by the selecting means, wherein the second signal is a signal remaining in the first transferring step (See the explanation above); and

Nakamura fails to teach adding the first and second signal read out to the signal line. However Merrill teaches wherein the output signals readout from the charge-voltage conversion unit are individually retained (col. 8 lines 51-54) and a horizontal scan is carried out after adding the output signals or while adding the output signals (col. 9 lines 30-36).

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Therefore taking the combined teachings of Nakamura and Merrill it would have been obvious to one skilled in the art to have been motivated to have adding the first and second signal read out to the signal line in order to increase the dynamic range.

[Claim 32]

Merrill teaches wherein the output signals readout from the charge-voltage conversion unit obtained by the division and the readout are individually retained (col. 8 lines 51-54) and a horizontal scan is carried out after adding the output signals or while adding the output signals (col. 9 lines 30-36).

[Claim 33]

Nakamura teaches an intermediate readout operation by performing the resetting of the charge-voltage conversion part and reading out output signals amplified by the amplification means to the signal output line (See figure 4c reset pulse , Also See Examiner's notes regarding claim 1).

[Claim 34]

Claim 34 is an apparatus claim corresponding to method claim 31. Therefore it has been analyzed and rejected based on method claim 31.

[Claim 35]

Nakamura discloses an embedded type photodiode used for photoelectric conversion unit (figure 3, photodiode 31).

[Claims 36 and 37]

Nakamura teaches the solid-state image pickup device of claim 34 and a signal processing circuit for processing output signals from the solid image pickup device (figure 13). Nakamura also

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teaches an optical system for focusing for focusing a ray of light to the solid-state image pickup device (col. 5 lines 55-57).

***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

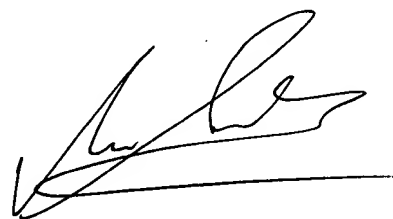
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yogesh K. Aggarwal whose telephone number is (571) 272-7360. The examiner can normally be reached on M-F 9:00AM-5:30PM.

6. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on (571)-272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

YKA  
May 18, 2007



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